Rev Black Polit Econ (2011) 38:83–101
DOI 10.1007/s12114-010-9082-y

The Economic Determinants of the Number of Minority Farmers in the Southeast Region of the United States, 1969-1997

Tonshia Luster · Andrew Barkley

Published online: 11 January 2011

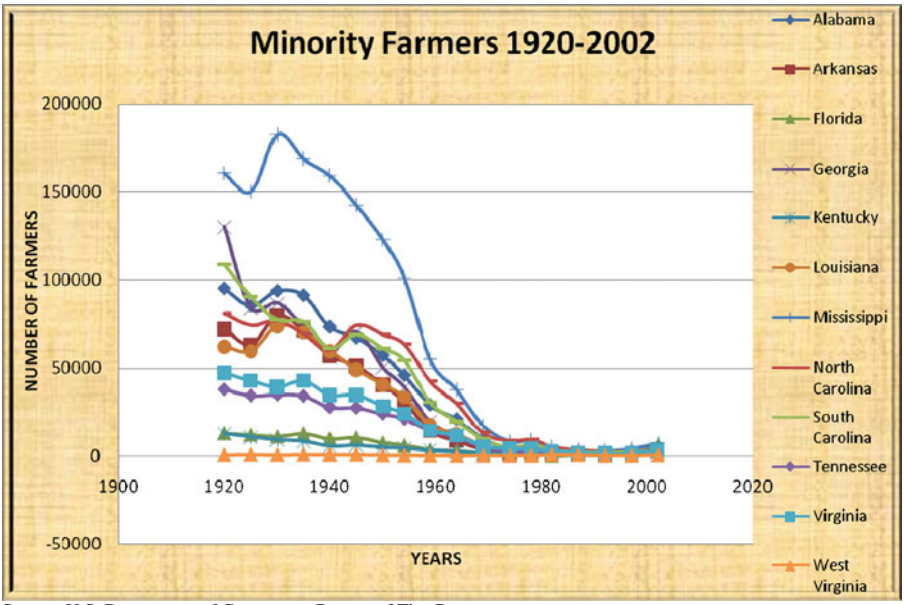
Abstract The primary purpose of this research was to identify and quantify the determinants of the number of minority farmers in the Southeast region of the United States during the time period, 1969 to 1997. A second objective was to determine the potential impacts of globalization and international trade agreements on the number of minority farmers in the Southeast region of the United States. Regression results indicated that the number of minority farm owners was responsive to the returns to agricultural labor relative to nonfarm labor returns, as well as to cotton and rice prices. An increase in the cotton price was associated with a smaller rate of minority migration out of agriculture in the Southeast region of the United States. To the extent that globalization is likely to result in higher cotton export prices, international agricultural trade agreements are likely to result in decreased movement of minority farmers out of agriculture in the Southeast region of the United States. A third objective was to compare occupational migration rates out of agriculture of minorities with farmers of all races in the Southeast region. The data demonstrate that minority farm owners exhibited distinctly different migration patterns relative to all farm owners during 1969–1997.

Keywords Minority farmers · Migration out of agriculture · Global trade agreements · Labor migration model

Introduction

One of the most interesting and important issues that many economists and other social scientists have raised is the continually decreasing number of minority farmers in the United States, as illustrated in Fig. 1. According to Brown and Larson (1977), the number of Black-operated farms reached a peak of 925,710 in 1920. By 1969,

T. Luster · A. Barkley (✉)
Department of Agricultural Economics, Kansas State University, Manhattan, KS 66506-4011, USA
e-mail: barkley@ksu.edu



Source: U.S. Department of Commerce. Bureau of The Census.

Fig. 1 Number of minority farmers, Southeast States, 1920–2002

the number of Black-operated farms had dropped 90.6% to 87,393, compared with a drop of 64% for all farms in the South and 57.7% for all farms in the nation. According to by Calvin Beale (1966), the rural population for African-Americans was highly concentrated in agriculture, and 97% of it was in the South. He also stated that African Americans migrated away from southern farms as a result of new opportunities in the industrial Northern part of the United States (U.S.) and that a decline in the total rural black population took place that had never been reversed until the time of writing, 1966. However, the USDA National Agricultural Statistics Service (USDA/NASS 2008) released their 2002 Census of Agriculture results in June 2008 that showed an increase in the percentage of land ownership among Black or African American principal operators since the previous Census. According to the 2002 Census of Agriculture news release, ninety-one percent of Black or African American principal operators represented 1.4% of all principal farm operators in the U.S., indicating an increase in the representation of small minority operated farmers compared to prior Censuses. This result was unexpected, and will be explained below.

According to Gilbert, Sharp, and Felin (2001), the total number of African-American farmers decreased over time because of the loss of landownership and farming operations, as well as other contributing factors. Beale (1971) believed that the displacement over the last 20 years was due to voluntary withdrawal or old age of the great majority of black farm operators. The principal role of African-American farmers has changed over time from hired farm workers to machinery operators.

The main objective of this research was to identify and quantify the determinants of the number of minority farmers in Southeast Region of the United States from the

period 1969 to 1997. A second objective was to determine the potential impact of international trade agreements on the number of minority farmers in their career choices to either stay or migrate into another career field. A third objective is to compare occupational migration rates of minorities out of agriculture with all farmers in the Southeast Region. Discovering the core motives that led to a significant decrease in minority farmers over the period 1969 to 1997 extends the literature on minority migration out of agriculture in the United States. Previous literature has shown that many minority farmers have moved from rural areas into the urban sector largely due to financial resources. Wood and Gilbert (1998) found that most African-American farmers depended principally on off-farm income, with farming as a secondary source. A limited number of studies, mostly census-based, provided evidence for the continuing decrease in the number of African-Americans entering the field of agriculture, and the likelihood of more minority farmers in the future. This research will explore the potential relationship between the number of minority farmers rates of return to agriculture and nonagriculture, and international trade, based on the number of farmers who have migrated out of the farming sector during the years 1969 to 1997.

Literature review

Previous migration research dealt mainly with forces that affect migration. In what follows, we review the literature on off-farm migration among minorities in the United States, emphasizing the economic determinants of occupational migration out of agriculture. We highlight the lack of previous research that examines the economic motivations for moving out of agriculture, a gap that this research seeks to address. Greenwood (1975) defined migration as farmers moving from one occupation to another for better opportunities, or economic motivations. Stark (2003) described migration as an individual response to a wage differential. Here, we define migration as when a person leaves farming to migrate to another career. The focus of this research is on minority farm opertors, as defined by the U.S. Census Bureau (U.S. Department of Commerce, Bureau of the Census). While our primary interest is on African-American farmers, data definitions and availability resulted in our study of farm operators of all minority groups. The Census defines the category, "Black and other races" to include Blacks, American Indians (Native Americans), Asian or Pacific Islanders, and all other racial groups other than White. We will further explore this definition in the data section below.

Salamon (1976) provided additional evidence that African Americans who owned land were losing their ability to maintain ownership, due to an inability to generate adequate income. Schulman (1989) discovered that both the average gross income and average total acres operated for non-white farmers were less than half that of white farmers, leaving non-white farmers at a higher risk of migration. Dawra (1990) asked why a farmer would want to explore other opportunities to maintain a decent level of living. One reason might be that a majority of small-scale farmers had been adversely affected by a decline in prices, which has caused an increase in debt. A second possible reason was the steady downward trend in prices, as well as a lack of resources. A third possible reason could be because farming is

among the least cost-effective occupations in their region, which gives them the option to look into other career fields (Dawra 1990).

Greenwood (1975), stated, "a finding common to a number of gross migration studies is that income (and job) opportunities provide a better explanation of in-migration than they do of out-migration" (p. 400). Household responsibilities are the general effects that would cause an individual to migrate for newer and better opportunities such as employment (Lee and Roseman 1999). According to Bass and Alexander (1972), the choice of where to work due to the environment and climate may be as significant as to work and for whom to work for. Their research indicated that Whites were more attracted to better climatic and economic conditions relative to Nonwhites, who were more attracted to better economic conditions alone. This result suggests a potential divergence between migration patterns between white and minority farm operators, a hypothesis which is thoroughly analyzed and reported in this study below. Brown, Christy, and Gebremldhin (1994) studied the influence of technical and institutional forces that affects the population increase of African American farmers. They argued that the changes in the structure of agriculture had a significant impact on small-scale farmers by constraining the strategies available to farmers to increasing their farm size.

Grim (1995) stated that between the 1950's and the 1970's, in spite of the farm programs such as loan increases to Black Farmers, there were still a large amount of farmers who left the field to search for better jobs, valuable educations, better housings, and more recreation. Reynolds (2003) stated that increases in land ownership after the early 1900's were partly due to a significant rise in cotton prices that lasted until the outbreak of World War I in 1914. Reynolds' research was consistent with Gilbert, Sharp, and Felin (2001). The authors stated that the difference in the Census reports from the 1997 to 2002 is that it shows a significant increase in the South, but particularly with black tenant farmers and sharecroppers. According to Ponder (1971), land ownership was of prime consideration to remaining in farming because the tenant had to give up his land when the owner wishes it and because of this the probability of minority farmers staying in the agricultural field would be low.

Browne (1973) studied the effects of agricultural technology, farm subsidy programs, and general tendency for farm youth to gravitate toward urbanized areas. This has been an issue for some time according to Gilbert, Sharp, and Wood, (2002) who discussed how out of all private agricultural land, Whites accounted for 96% of the owners, 97% of the value, and 98% of the acre; while 25 million acres of land is owned by minorities. Their paper discussed the social, economic, cultural, and political consequences that are a result of land ownership. Molnar, Thompson, and Beauford (1988) identified another cause of this decrease as the advent of machinery that encouraged large farms and eliminated the need for small-scale tenant farmers. They also believed that African Americans faced great structural barriers such as discriminatory attitudes that often blocked their advancement in agriculture.

Wood and Gilbert (1998) asserted that farming may be less attractive to the younger generation due to the fact that it is looked at as a memory of slavery and sharecropping. Their beliefs are that we are wasting our time on trying to convince others to enter farming but to encourage the improvement of poor rural communities

through education, training, and economic development. They believe that if agriculture would be a more viable business and a way of life by encouraging land retention and recovery efforts from the past, then the decline of African-American farmers and landowners could be reversed. Wood and Gilbert (2000) stated that the primary reason for decline of African-American farmers was due to the twin engines of increased mechanization and the dismantling of the sharecropping system. The research primarily targeted African-American farmers in the Mississippi Delta. However, these previous studies showed that a significant amount of African-American farmers still owned their land and would like to return but due to public policies, economic pressures, and racial oppression, many minority farmers find it impossible to return.

Several studies have attempted to investigate the relationships between the flow of labor out of agriculture and economic variables. Barkley (1990) analyzed a migration model, and found that when farm income increased relative to nonfarm income, the level of agricultural employment increased. Mundlak's (2000) research was similar to Barkley's, and he also hypothesized that if nonagricultural jobs were more attractive than agricultural jobs, then a decrease in farm labor is likely; if agriculture was more attractive than nonagriculture, an increase in farm labor is expected. In the research reported here, we use the economic approach of Barkley (1990) to explain minority migration of out of agriculture, as modeled formally in the next section. This approach emphasizes the economic differences between agriculture and the nonfarm sector. Institutions and structural changes have been shown to be important determinants of minority migration out of agriculture, but here influence labor movements only through their impact on economic variables, primarily the returns to labor in each sector.

Theory of migration and how populations change

Following Barkley (1990), a migration equation model was developed to examine the determinants of the number of minority farm owners in the Southeast Region of the United States. The Census of Agriculture defines a minority farm operator as an individual who farms the land; note that this category does not include hired farm workers. The category, "Black and other races" includes Blacks, American Indians (Native Americans), Asian or Pacific Islanders, and all other racial groups other than White (U.S. Department of Commerce, Bureau of the Census). The Census definition is for race and ethnicity; the data in these categories include both men and women. Thus, white females are not included in the minority data reported here.

Historically, the decline in the share of agriculture in the farm labor force has occurred over centuries (Barkley 1990). The term migration is an approximation to actual occupational migration out of production agriculture, and it considers only changes in the number of jobs in the farm sector. There are two ways of measuring changes in the number of workers in a given occupation such as agriculture: (1) the level of labor (L), and (2) changes in this level, or the rate of migration (M). All abbreviations in what follows are listed in Table 1. To determine the total amount of Labor in agriculture, we defined of L_{ag} to be a function of wages in agriculture (W_{ag}), nonagricultural wages (W_{nonag}), and agricultural output prices ($P_{c,}$ P_r). Eq. (1)

Table 1 Abbreviations of included variables

Variable	Description
L_{ag}	Number of minority farmers in each Southeast State
L_{nonag}	Labor in non agriculture in each Southeast State
M	Labor migration
D	non agriculture GDP per person/agriculture GDP per person
g	labor in non agriculture/labor in agriculture=L_{nonag}/L_{ag}
P_r	real price of rice
P_c	real price of cotton
AL	Alabama
AR	Arkansas
FL	Florida
GA	Georgia
KY	Kentucky
LA	Louisiana
MS	Mississippi
NC	North Carolina
SC	South Carolina
TN	Tennessee
TX	Texas
VA	Virginia
WV	West Virginia
W_{ag}	wage rates in agriculture
W_{nonag}	wage rates in non agriculture
GDP_{ag}	gross domestic product in agriculture
GDP_{nonag}	gross domestic product in nonagriculture

Regression results are reported for two data sets: (1) twelve Southeastern States, and (2) twelve Southeastern States and Texas.

through (5) were used to determine the total amount of labor employed in agriculture.

$$L_{ag} = f\left(W_{ag}, W_{nonag}, P_{c,}P_r\right) \tag{1}$$

where

$$W_{ag} = GDP_{ag}/L_{ag} \tag{2}$$

and

$$W_{nonag} = GDP_{nonag}/L_{nonag}. \tag{3}$$

The variable P_c is the cotton price and P_r is the rice price. Eq. (4) is the definition of D, the returns to labor in nonagriculture relative to the returns to labor in

agriculture. The variable D is defined as the total non agriculture GDP per person divided by the total agricultural GDP per person.

$$D = \left(GDP_{nonag}/L_{nonag}\right)/\left(GDP_{ag}/L_{ag}\right) \tag{4}$$

Following Mundlak (2000) and Barkley (1990), the relative size of the labor force (g) is introduced into the migration equation by defining the variable g to be equal to the total amount of labor in non agriculture divided by the total amount of labor in agriculture, as in Eq. (5).

$$g = L_{nonag}/L_{ag} \tag{5}$$

The size of the agricultural labor force relative to the nonfarm labor force is included in the model to capture the ability of the nonfarm sector to absorb farmers exiting the agricultural sector. A large nonfarm economy provides much better prospects for successful occupational change out of farming. Thus, the size of agriculture relative to the nonfarm economy is captured in the variable g, and included in the empirical model.

In Eq. (6), we also used the real price indexes (P_c and P_r) of two different crops, cotton and rice, to determine the level of migration. For an example, if the price of cotton (P_c) increases; than the number of minority farmers migrating into agriculture would be expected to increase as well. The number of workers in agriculture (L_{ag}) is expected to depend on the relative size of the labor force in each sector, reflecting the probability of obtaining employment in each sector. Where D=non-agriculture GDP per person/agriculture GDP per person, g=labor in non-agriculture/labor in agriculture, P_c is the real price of cotton, and P_r is the real price of rice.

$$L_{ag} = f(D, g, P_c, P_r,) \tag{6}$$

A regression was estimated with the dependent variable equal to the total number of minority farmers in each state, and the independent (explanatory) variables include D, g, and cotton and rice prices. We estimated alternative regressions with using dummy variables of the twelve southern states and years of 1969–1997. Also we tested several other potential explanatory variables including the prices of corn, soybeans, and sorghum.

However, each of these variables was statistically insignificant in regression trials. Four out of the six crop price variables were eliminated due to potential multicollinearity (Kennedy 2008). Collinearity exists across the commodity price time series, since commodity prices are highly correlated due to market forces. This approach has been used extensively in models that include commodity prices, including Blank and Ayer (1987), Bailey and Womack (1985), and Chambers and Just (1979). Out of the six crop prices that were originally included in the regression, two were found to have statistical significance in preliminary regressions: cotton and rice. The model is specified in (7).

$$L_{ag} = \beta_0 + \beta_1 D + \beta_2 g + \beta_3 P_r + \beta_4 P_C + e \tag{7}$$

Where:

L_{ag} Labor in agriculture
B_0 The intercept of the regression line produced by the model

D The total percentage of returns for non agriculture relative to returns for agriculture workers
g The total size of the labor force in nonagriculture relative to labor in agriculture
Pr The annual price of rice in the USA
Pc The annual price of cotton in the USA
e The error produced by the regression model.

Note that this model is specified without race included; the specification is general enough to accommodate occupational migration for any racial group. We estimated the model for minorities in American agriculture, to extend the results of Barkley (1990), who estimated the same model for all farmers in the United States. Additionally, we compare migration rates out of agriculture in the Southeast Region across white farmers and minority farmers. These populations changes are further discussed in the next section, where differences between minority and white farm owner migration is highlighted. In the model estimated here, the expected signs of the coefficients are (all other variables remaining constant):

$\beta 1 < 0$ As returns to labor in the nonagricultural sector increase relative to farm returns, we expect the number of farm workers to decrease due to better economic opportunities.
$\beta 2 < 0$ As the nonagricultural labor force increases relative to the farm labor force, we expect the number of farm workers to decrease, since a large nonfarm sector is more capable of absorbing off-farm migrants.
$\beta 3 > 0$ As the price of rice increases, we expect the total number of farm workers to increase, due to expanded incomes and opportunities in rice growing areas, holding constant the overall returns to labor in agriculture relative to nonfarm returns.
$\beta 4 > 0$ As the price of cotton increases, we expect the total number of farm workers to increase, due to expanded incomes and opportunities in cotton growing areas, holding constant the overall returns to labor in agriculture relative to nonfarm returns.

We hypothesize that if farming in the Southeast were to become more economically attractive, more minority farmers are likely to remain in agriculture in the Southeast region. As farming revenues and the prices for crop variables increase, we expect for the total number of minority farmers to increase, or, since the overall trend in the number of farmers is downward, decrease at a decreasing rate.

There is an interesting alternative hypothesis regarding the estimated coefficients on the commodity prices. Higher commodity prices could provide the necessary level of income to cover the cost of migration, in which case the coefficients $\beta 3$ and $\beta 4$ would have a negative sign. In this case, the supply of labor to agriculture would be "backward bending," or the income effect would outweigh the effect of supply response to higher earnings (Hanoch 1965). The regression model estimated here would also allow for this possibility, and the empirical results will demonstrate which hypothesis is supported by the data.

Data

The data were taken from the Bureau of the Census (US Department of Commerce) for the number of white and minority farmers in the Southeast. We selected the Southeast due to the fact that the Southeast Region is historically more prominent in minority farming than other regions in the United States. According to the Census, in 1964 there were a total of 199,952 nonwhite farm operators in the United States, and of this total, 92% were African Americans and 8% were classified as other nonwhite. Ninety-two percent of all nonwhite operators were in the South, and of these 98% were black and so being that the South had a larger percentage of African Americans (Ponder 1971). Therefore, our targeted areas were the 12 states in the Southeast Region, including Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. Texas was excluded from the original data set, as it was considered to have more in common with the semi-arid Great Plains agriculture, rather than the Southeastern region examined here. In an alternative specification of the model, Texas was included to find the similarities and differences in minority migration out of agriculture between Texas and the Southeast region.

Data on the number of farmers in all twelve Southern states were collected from the United States Department of Commerce, Census Bureau. Real per capita gross domestic product (GDP) data were collected from the United States Department of Commerce Bureau of Economic Analysis (BEA). The data included the years of 1969 to 1997 for the twelve Southern states. We originally desired to start the data with the year of 1920, but due to lack of data availability for Gross Domestic Product in agriculture and nonagriculture and an accurate account for the total of minority farmers, we were constrained to start the data in 1969. The ending data was 1997, since the 2002 Census data had been redefined, and were no longer consistent with the data from the earlier time period. Specifically, beginning in 2002, multiple operators per farm were counted, leading to significantly larger numbers of minority farmers included, compared to previous years, as evident in Table 2 and Fig. 1.

Also, beginning with the 1997 Census of Agriculture, the National Agricultural Statistical Service (NASS) directed the Census, instead of the Department of Commerce. This change led to special efforts to more accurately measure women and minority farmers, particularly in the 2002 Census (USDA/NASS Quick Stats). These activities included, but were not limited to, obtaining mail lists from organizations likely to contain names and addresses of minority farm operators and conducting pre-census promotion activities that targeted women, American Indian and Alaska Native, Black and African American, and Spanish, Hispanic, or Latino origin farm operators (USDA/NASS Quick Stats). Gilbert, Sharp, and Felin (2001) provided an outstanding review and summary of these data issues, and concluded, “Despite the drawbacks of the Census of Agriculture, it is the best source of data on farmers. It is the most comprehensive compiling national data down to the county level. It recurs every 5 years, is accessible, and easy to use.” Thus, we use the Census data in this research, but limit our time period to before 2002, due to the change in statistical methodology.

The GDP data were taken from the United States Department of Commerce/BEA website located under the “Regional” section for Gross Domestic Product by State.

Table 2 Number of minority farmers, twelve Southeastern States and Texas, 1964–2002

State	2002	1997	1992	1987	1982	1978	1974	1969	1964
Alabama	4,066	2,251	1,535	1,902	2,813	4,883	3,962	9,873	20,951
Arkansas	2,783	780	848	912	1,368	2,196	1,822	3,775	8,595
Florida	6,257	807	1,126	974	59	2,478	968	1,365	2,832
Georgia	3,374	1,487	1,177	1,297	2,102	4,551	2,963	5,571	11,239
Kentucky	2,049	593	714	747	1,006	1,210	1,053	1,753	2,483
Louisiana	3,172	1,580	1,182	1,253	1,951	3,400	2,723	5,518	12,300
Mississippi	6,935	3,925	2,523	3,033	4,831	8,887	8,173	17,184	37,715
North Carolina	3,677	2,212	2,498	3,303	5,352	9,289	8,605	13,111	29,926
South Carolina	2,794	1,949	1,819	2,038	3,170	6,489	4,606	9,535	19,616
Tennessee	2,700	1,201	1,042	1,278	1,672	2,477	2,391	4,930	10,660
Virginia	2,900	1,456	1,384	1,756	2,772	3,978	3,977	5,453	11,621
West Virginia	393	31	44	466	613	65	33	45	92
Texas	8,486	7,862	6,001	5,579	5,433	4,938	3,698	5,375	11,630

Source: USDA/NASS.

Regression results are reported for two data sets: (1) twelve Southeastern States, and (2) twelve Southeastern States and Texas.

The GDP in agriculture data were also taken from the same section but under the section named agriculture, forestry, fishing, and hunting. The GDP in Non Agriculture data were calculated by subtracting the total GDP for each state from the total amount of GDP in agriculture for each state. The total amount of Employment was taken from the U.S. Department of Commerce BEA website located under Regional Economic Accounts and State Annual Personal Income.

The second set of data required inflation adjusted prices of rice and cotton. This information was taken from the annual publications of the (USDA/NASS Agricultural Prices). To adjust for inflation, the Consumer Price Index (CPI) was used, taken from the Bureau of Labor Statistics (United States Department of Labor, Bureau of Labor Statistics 2008). Dollars were adjusted to 100 in 2007.

The first included crop price was cotton. Cotton in the South is a very dominant cash crop and generates three-fourths of the world's cotton supply. "Cotton is the single most important textile fiber in the world, accounting for nearly 40% of the total world fiber production. While some 80 countries from around the globe produce cotton, the United States, China, and India together provide over half the world's cotton. The U.S. cotton industry typically generates over 400,000 jobs in the industry sectors from farm to textile mill" (USDA/ERS Briefing Room Cotton, 2008). Rice was first planted in the USA in South Carolina and found its place in society mainly in the southern states such as Arkansas, Louisiana, and east Texas since the 1800 s. "Rice is produced worldwide and is the primary staple for more than half the world's population. In the United States, rice farming is a high-cost, high-yielding, large-scale production sector that depends on the global market for almost half its annual sales." (USDA/ERS Briefing Room Rice 2008).

Table 2 shows the total number of minority farmers from the years of 1964–2002 (United States Department of Commerce, Bureau of the Census). Table 3 is the total number of white farmers for the time period 1964–2002 (United States Department of Commerce, Bureau of the Census). Table 4 reports the total number of white and non white farmer's form the years of 1964–2002. This Census data were also collected from the United States Department of Commerce, Bureau of the Census. Although much effort was expended making the census mail list (CML) as complete as possible by National Agricultural Statistics Service (NASS), the total coverage of farms was considered inadequate. Gilbert, Sharp, and Felin (2001) reported definitional changes in the census instrument resulted in large changes in the number of minorities in agriculture. Because of these major changes, we excluded the 2002 census numbers due to lack of comparability, as detailed below.

Therefore, we investigated how the number of minority farmers changed over the period 1969 to 1997, and compare the rate of change to that of all farmers during the same period (Fig. 2). This allows us to see if minority occupational migration out of agriculture is similar to or different from all farmer migration. Table 5 presents data indicating the percent change in the total number of all farmers as well as the total amount of minority farmers. We took the total number of white and non-white farmers during the years of 1969 and 1997 to give us an overview of the structural trends that have taken place over that time period. The percentage of minority farmers had a higher decrease in change than the total number of all white farmers (Table 5). These results indicate that the changes in the number of minorities farming were greater than the changes in the number of white farmers over time, demonstrating that there is a difference between minority farmers and white farmers entering and exiting agriculture. For example, in Alabama, the percent change for all farmers equaled −42% between the

Table 3 Number of white farm operators, twelve Southeastern States and Texas, 1964–2002

State	2002	1997	1992	1987	1982	1978	1974	1969	1964
AL	57,863	39,658	36,370	42,265	45,635	47,573	52,716	62,618	71,579
AR	65,838	44,208	43,089	47,330	49,157	50,063	49,137	56,658	71,303
FL	60,195	33,481	34,078	35,582	35,366	34,939	31,498	34,221	37,710
GA	63,239	39,005	39,582	42,255	47,528	48,691	51,948	61,860	72,127
KY	119,703	81,567	89,567	91,706	100,636	101,117	101,000	123,316	130,555
LA	35,170	22,657	25,470	26,097	29,677	29,353	30,517	36,751	50,166
MS	50,069	29,094	29,475	31,041	37,584	39,038	45,447	55,393	71,426
NC	71,052	47,295	49,356	55,981	67,440	74,740	82,675	106,275	118,276
SC	30,303	18,701	18,423	18,479	21,759	22,907	24,669	30,024	36,632
TN	118,922	75,735	74,034	78,433	88,893	85,084	91,268	116,476	122,786
VA	65,793	39,854	40,838	43,043	49,087	46,778	48,722	69,119	68,733
WV	28,946	17,702	16,976	17,191	18,688	17,423	16,876	23,097	34,412
TX	220,440	186,439	174,643	183,209	179,587	170,457	170,370	208,175	193,480

Source: USDA/NASS.

Regression results are reported for two data sets: (1) twelve Southeastern States, and (2) twelve Southeastern States and Texas.

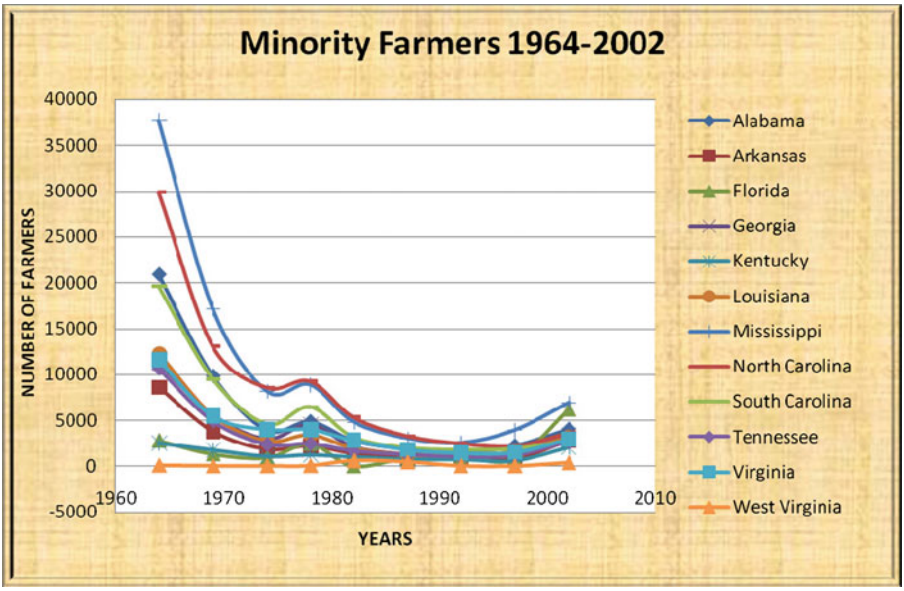
Table 4 Number of white and non-white farm operators, twelve Southeastern States and Texas, 1964–2002

State	2002	1997	1992	1987	1982	1978	1974	1969	1964
AL	45,126	41,384	37,905	43,318	48,448	50,780	56,678	72,491	92,530
AR	47,483	45,142	43,937	48,242	50,525	51,751	50,959	60,433	79,898
FL	44,081	34,799	35,204	36,556	36,352	36,109	32,466	35,586	40,542
GA	49,311	40,334	40,759	43,552	49,630	51,405	54,911	67,431	83,366
KY	86,541	82,273	90,281	92,453	101,642	102,263	102,053	125,069	133,038
LA	27,413	23,823	25,652	27,350	31,628	31,370	33,240	42,269	62,466
MS	42,186	31,318	31,998	34,074	42,415	44,104	53,620	72,577	109,141
NC	53,930	49,406	51,854	59,284	72,792	81,706	91,280	119,386	148,202
SC	24,541	20,189	20,242	20,517	24,929	26,706	29,275	39,559	56,248
TN	87,595	76,818	75,076	79,711	90,565	86,910	93,659	121,406	133,446
VA	47,606	41,095	42,222	44,799	51,859	49,936	52,699	64,572	80,354
WV	20,812	17,772	17,020	17,237	18,742	17,475	16,909	23,142	34,504
TX	228,926	194,301	180,644	188,788	185,020	175,395	174,068	213,550	205,110

Source: USDA/NASS.

Regression results are reported for two data sets: (1) twelve Southeastern States, and (2) twelve Southeastern States and Texas.

years 1969 to 1997. The percent change for minority farmers for the years 1969 to 1997 was −77%. There was a significantly larger percentage of minority farmers entering and exiting the field of agriculture than all farmers. However, if the all farmer percentages were similar to minority farmers, then we could conclude that labor migration was



Source: U.S. Department of Commerce. Bureau of the Census

Fig. 2 Number of minority farmers, Southeast States, 1964–2002

Table 5 Structural trends in twelve Southeastern States and Texas: minority farmers and all farmers, 1969-97

	State(s)	All Farmers		% Change	Minority Farmers		% Change
Year(s)		1997	1969		1997	1997	
	Alabama	41,384	72,491	−42%	2,251	9,873	−77%
	Arkansas	45,142	60,433	−25%	780	3,775	−79%
	Florida	34,799	35,586	−2.2%	807	1,365	−40%
	Georgia	40,334	67,431	−40%	1,487	5,571	−73%
	Kentucky	82,273	125,069	−34%	593	1,753	−66%
	Louisiana	23,823	42,269	−43%	1,580	5,518	−71%
	Mississippi	31,318	72,577	−56%	3,925	17,184	−77%
	North Carolina	49,406	119,386	−58%	2,212	13,111	−83%
	South Carolina	20,189	39,559	−48%	1,949	9,535	−79%
	Tennessee	76,818	121,406	−36%	1,201	4,930	−75%
	Virginia	41,095	64,572	−36%	1,456	5,453	−73%
	West Virginia	17,772	23,142	−23%	31	45	−31%
	Texas[a]	194,301	213,550	−9.0%	7862	5375	+46%

[a] Texas is not included in the primary regression, but results are reported for a second regression that included Texas.

similar for both minority and whites. Since the changes differ significantly, minority migration levels differ, resulting in the motivation for this study of minority farmers, to measure the impact of economic variables on minority migration out of agriculture separately from all farm operators, which was studied by Barkley (1990).

The results for the regression that includes Texas in Table 5 demonstrate why it was excluded from the original data. During the period 1969 to 1997, the number of minority farm operators in Texas increased from 5375 to 7862. This pattern is opposite of the twelve Southeastern states excluding Texas, where large decreases of minority farmers occurred. Texas agriculture is distinct and separate from agriculture in the Southeast, as the arid Great Plains receive a much lower level of precipitation than the Southeastern states.

Results

The purpose of this research was to identify and quantify the determinants of the change in the number of minority farmers in the Southeast Region of the United States, during the time period 1969 to 1997. The second objective was to determine the potential impact of international trade agreements on the number of minority farmers and their career choices in the Southeast region of the United States. Table 6 lists the descriptive statistics of the variables that were included in the migration model described in equation (7). The first variable L, total number of minority farmers, had a mean of 2977.67, standard deviation of 330.30, minimum of 0.31 and a maximum of 17184. The second variable D, the ratio of nonfarm returns divided by farm returns, had a

Table 6 Migration model variables descriptive statistics, twelve Southeastern States

Variables	Description	Mean	Std Dev	Min	Max
L	Total number of Minority farmers in each southern state	2977.67 (3244.03)	330.20 (3124.16)	31 (31)	17184 (17184)
D	Ratio of nonfarm returns to agricultural returns in each southern state	1.24 (1.18)	0.09 (0.82)	0.23 (0.23)	4.28 (4.28)
g	Relative size of the labor force in non agriculture to agriculture in each southern state	52.54 (57.41)	4.39 (42.79)	9.65 (9.65)	230.85 (230.85)
Pr	price of rice ($/cwt) national average	43.77	4.45	7.48	123.99
Pc	price of cotton (cents/lbs) national average	253.29	17.56	86.46	538.54

Numbers reported in parentheses are for twelve Southeastern States and Texas.

mean of 1.24, standard deviation of 0.09, minimum of 0.23 and a maximum of 4.279. The third variable g, the relative size of the labor force in non agriculture to agriculture, had a mean of 52.54, standard deviation of 4.39, minimum of 9.65, and a maximum of 230.85. The fourth variable Pr, which is the real price of rice, had a mean of 43.77, standard deviation of 4.45, minimum of 7.48, and a maximum of 123.99. The final variable Pc, the real price of cotton, had a mean of 253.29, standard deviation of 17.56, minimum of 86.46, and a maximum of 538.54. A second data set was defined by the addition of Texas to the original twelve states. The summary statistics for Texas are included in parentheses in Table 6. Table 7 presents the regression results of the model and calculated elasticities.

Table 7 Regression results for number of minority farmers in Southeast Agriculture, 1969–97

	12 Southeastern States			12 Southeastern States and Texas		
Variable	Coefficient	t-Stat	Elasticity	Coefficient	t-Stat	Elasticity
Intercept	3477.031	2.698[a]	–	3165.640	2.403[b]	–
D	−1150.740	−2.973[a]	−0.48	−1194.547	−2.872[a]	−0.44
g	−23.546	−2.743[a]	−0.41	−12.782	−1.534	−0.23
Pr	−36.553	−1.129	−0.53	−32.085	−0.959	−0.43
Pc	14.870	1.787[c]	1.26	14.338	1.677[c]	1.12
R-Square		0.297			0.230	
Adj. R-Square		0.262			0.194	
Standard Error		2600.588			2804.700	
Observations		84			91	
F-test		8.35[a]			6.417[a]	

[a] indicates statistical significance at the one percent level, [b] indicates statistical significance at the five percent level, and [c] indicates statistical significance at the ten percent level.

The regression model reported in Table 7 expands upon those utilized in previous studies undertaken by the United Stated Department of Economic Research Services and the United States Department of Bureau and Labor Statistics. In this regression model, the adjusted R^2 statistic equaled 0.262, thus 26.2% of the variation in the number of minority farmers was explained by this model. Our results concluded that economic variables are statistically significant in the determinants for minority farmers migrating to and from the field of agriculture. The dependent variable of our model, (L) is the total number of minority farmers in agriculture in each southeastern state. The intercept was equal to 3477.03, indicating the "baseline" number of farmers in each Southeastern state.

Our next regression results were for the independent variables D, g, Pr, and Pc which were all significant except Pr. The first independent variable (D) defined as the ratio of nonfarm returns divided by farm returns, was significant at the (0.01) percent level. This result shows that if the total number of nonfarm returns to agricultural returns was to increase by one, then the total number of minority farmers would decrease by 1150.740 persons. Meaning that as income was to increase in the non-agricultural sector, and then more minority farmers would leave the field of agriculture for better income opportunities. The second independent variable g, defined as the relative size of labor force in nonagriculture to agriculture had a significance level of (0.01) percent. This result shows that if the relative size of the labor force in non-agriculture to agriculture was to increase by one, then the total number of minority farmers would decrease by 23.546 persons. Meaning that as the number of workers in the nonagricultural sector begins to increase; the total number of minority farmers would decrease because of the possibility of better job opportunities as measured by the variable g.

The third independent variable, Pr, had no statistically significant value and is interpreted to be not statistically significantly different than zero. The fourth variable, Pc, the price of cotton, was also found to be significant but at the (0.10) percent level. This result indicates that if the price of cotton was to increase, the total number of minority farmers in the Southeast would increase by 14.84 persons. This result provides the conclusion that as the price of cotton increases, more minority farmers would either stay or enter into the field of agriculture. This conclusion has also allowed us to forecast the potential impact of globalization and free trade agreements on minority farmers migrating to and from the field of agriculture.

Currently, international trade in both cotton and rice is subject to trade barriers, primarily import tariffs and quotas that serve to subsidize cotton and rice producers in importing nations. A large body of published research suggests that commodity prices would increase with the removal of these trade barriers. The International Cotton Advisory Committee (ICAC 2003) reported that average cotton prices during the 200-01 and 2001-02 season s would have been 17 and 31 cents a pound higher, respectively, in the absence of direct subsides (Baffes 2005, p. 269). According to Quirke (2002), the elimination of cotton production and export subsidies by the U.S. and the E.U. would result in a 10.7% increase in the world cotton price. FAPRI (2002) found that removal of trade barriers and domestic support of all commodity sectors would result in an increase in the world cotton price of 12.7% over a 10-year period (Baffes 2005, p. 268, Table 14.4). Durland-Morat and Wailes (2003) showed a significant expansion of rice trade and large price adjustments as a result of the

potential elimination of import tariffs and export subsidies. Complete liberalization would have resulted in a significant expansion in global rice trade and an average export price increase of 32.8% (Wailes 2005, p. 186).

If free trade barriers in international cotton and rice markets were to be liberalized, the prices of cotton in the United States are most likely to increase (FAPRI 2002; Baffe 2005; Durlant-Morat and Wailes 2003; Wailes 2005; Quirke 2002) and cause minority farmers income to increase as well, giving them a reason to remain in the field of agriculture. Given this result, to the extent that trade agreements are likely to increase commodity prices through increased exports from the USA, globalization and international trade agreements are likely to increase the number of minority farmers in the Southeast region of the United States, or slow the outmigration of minority farmers out of the region. This is likely to be true for rice, but the estimated coefficient on the price of rice was found to be statistically insignificant. Therefore, the number of minority farm operators in the Southeastern region was found to be not statistically related to the price of rice, holding all else constant.

The results in Table 7 also include elasticities, which allow for comparison of impact of each in dependent variable on the number of minority farmers. The first independent variable (D), the ratio of nonfarm returns divided by farm returns, had an elasticity of negative 0.48. The second independent variable g, the ratio of the size of labor force in nonagriculture to agriculture, had an elasticity unit of negative 0.41. The third independent variable, Pr, price of rice, had no statistically significant value, and its elasticity was interpreted as not statistically significantly different as zero. The fourth variable, Pc, the price of cotton, had an elasticity of 1.26, indicating that the number of minority farmers was most responsive to cotton prices during the time period under investigation. Qualitative results for the regression including Texas are identical, although some differences in magnitude of the estimated coefficients exist. The most prominent difference is the estimated coefficient on the relative size of the labor force (g). The elasticity of the number of minority farmers with respect to the variable g equaled −0.41 for the twelve Southeastern states, but was equal to −0.23 when Texas was included (Table 7). This indicates that minority farmers in Texas were less responsive to the size of the nonfarm labor force, compared to Southeastern minority farmers, reflecting differences in agriculture in the two regions.

Conclusions and implications

This study has provided empirical evidence that (a) minority farmers' response to economic conditions in the Southeastern Region of the United States is statistically significant and (b) the returns to farming, relative to nonfarm occupations returns to labor is associated with a direct correlation with a minority farmer's decision to migrate into or out of the field of agriculture and (c) globalization and international trade are likely to cause a response to minority farmers migration. In today's society, farming is neither an option nor a necessity unless there is an economic benefit for farmers. For this reason, it has caused fewer minority farmers to continue into the field of agriculture. The responsiveness of labor to migrate in or out of agriculture

based on labor returns is one primary determinant of minority farmer's occupational choice. Our research has shown that economic determinants have a direct effect on the number of minority farmers migrating in and out of the field of agriculture. Our results have also demonstrated that if income was to increase in the nonagricultural sector, then the total number of minority farmers would decrease due to better income opportunities. Our results also show that if more people were employed the nonagricultural sector, than minority farmers would also decrease because of the assumption of better job opportunities. The final conclusion was the impact of price of cotton, which was found to have a statistically significant impact on the migration of minority labor out of agriculture in the Southeastern region.

Cotton is produced globally, and one of the most important textile fibers in the world, including in China and India. Our results demonstrated that if the export price of cotton were to increase, then the number of minority farmers in the American Southeast would increase. This analysis was a good indicator that the impact of international trade could have a strong effect on the determinants of minority farmers migration out of agriculture. Historically, the United States Department of Agriculture and other Agriculture Extension Agencies have made several attempts to make the field of agriculture as attractive as possible to minority farmers, along with a few trials and errors. Agriculture Secretary Ann M. Veneman (2003) stated on September 3, 2003 in Washington, D.C.:

> We are committed to helping the nation's minority and disadvantaged farmers... The grants will help many farmers and ranchers to successfully acquire, own, operate and retain farms and ranches by delivering a wide range of outreach and assistance activities including farm management, financial management and marketing.

To the extent that trade agreements increase commodity export prices, globalization and trade are consistent with this stated policy. Therefore, our research results indicate that globalization and international trade agreements may be complementary to other public policies intended to support minority farmers.

References

Baffes, John. 2005. "Cotton: Market Setting, Trade Policies, and Issues." In *Global Agricultural Trade and Developing Countries*, Eds. M. Ataman Aksoy and John C. Beghin. Washington D.C.: The World Bank, 2005, pp. 259–273.

Bailey KW, Womack AW. Wheat Acreage Response: A Regional Econometric Investigation. South J Agric Econ. 1985;2:171–80.

Barkley A. The Determinants of the Migration of Labor out of Agriculture in the United States, 1940-85. Am J Agricultural Econ. 1990;72(3):567–73.

Bass B, Alexander R. Climate, Economy, and the Differenial Migration of White and Nonwhite Workers. J Appl Psychol. 1972;56(6):518–21.

Beale C. Rural-Urban Migration of Blacks: Past and Future. Am J Agric Econ. 1971;53(2):302–7.

Beale, Calvin. (1966). "The Negro in American Agriculture." *John P. Davis The American Negro Reference Book.* Englewood Cliffs, N.S.: Prentice-Hall 161–204.

Blank SC, Ayer HW. Government Policy Cross Effects: The Cotton and Dairy Programs' Influence on Alfalfa Hay Markets. Agribusiness. 1987;3(4):385–92.

Brown, Minnie and O. Larson. (1977). "Successful Black Farmers: Factors in Their Achievement." Cooperative State Research Service (DOA), Washington, D.C. 37.

Brown Jr Adell, Christy R, Gebremedhin T. "Structural Changes In U.S. Agriculture: Implications for African American Farmers.". Rev Black Polit Econ. 1994;22(4):51–71.

Browne R. Only Six Million Acres: The Decline of Black-Owned Land in the Rural South. New York: Black Economic Research Center. New York; 1973.

Chambers RG, Just RE. A Critique of Exchange Rate Treatment in Agricultural Trade Models. Am J Agric Econ. 1979;61(2):249–57.

Dawra S. Benefiting Small Scale and Marginal Farmers Through Trade Liberalization and Inter-Cooperative Trade in Agricultural Commodities. Food Fertilizer Technol Cent EB. 1990;324:7–16.

Durland-Morat A, Wailes EJ. "RICEFLOW: A Spatial Equilibrium Model of World Rice Trade." Staff Paper SP 02 2003. University of Arkansas, Department of Agricultural Economics and Agribusiness. Fayetteville: Division of Agriculture; 2003.

FAPRI (Food and Agricultural Policy Research Institute). 2002. "The Doha Round of the World Trade Organization: Liberalization of Agricultural Markets and its Impact on Developing Economics." Paper presented at the IATRC Winter Meetings, San Diego, California.

Gilbert, J., G. Sharp, and M. Felin (2001). "The Decline (and Revival?) of Black Farmers and Rural Landowners: A Review of the Research Literature." *An Institute For Research And Education On Social Structure, Rural Institutions, Resource Use, And Development.* Working Paper (44).

Gilbert J, Sharp G, Wood S. Who Owns The Land? Agriculture Land Ownership by Race/Ethnicity. Rural Am. 2002;17(4):55–62.

Greenwood MJ. "Research on Internal Migration in the United States: A Survey". Am Econ Rev. 1975;13 (2):397–433.

Grim V. The Politics of Inclusion: Black Farmers and the Quest for Agribusiness Participation, 1945-1990s. Agric Hist Soc. 1995;69(2):257–71.

Hanoch, G. (1965). "The "Backward-bending" Supply of Labor." *The Journal of Political Economy* (73, 6):636–642.

ICAC (International Cotton Advisory Committee). (2003). *Production and Trade Policies Affecting the Cotton Industry.* Washington, D.C.

Kennedy P. *A Guide to Econometrics*, 6e. Malden, Massachusetts: Blackwell Publishing; 2008.

Lee S, Roseman C. Migration Determinants and Employment Consequences of White and Black Families, 1985–1990. Econ Geogr. 1999;75(2):109–33.

Molnar J, Thompson A, Beauford E. Minority Perspectives on Farming, Food, and Agriculture. Cult Agric. 1988;36:1–5.

Mundlak, Yair. (2000). "The Dynamics of Re-source Allocation: Labor" Agriculture and Economic Growth: Theory and Measurement, chap. 9. London, England: Harvard University Press.

Ponder H. Prospects for Black Farmers in the Years Ahead. Am J Agric Econ. 1971;53(2):297–301.

Quirke D. Trade Distortions and Cotton Markets: Implications for Global Cotton Producers. Canberra: Cotton Research and Development Corporation, Centre for International Economics; 2002.

Reynolds, Bruce. (2003). "Black Farmers in America, 1865-2000 The Pursuit of Independent Farming and the Role of Cooperatives." United States Department of Agriculture. Rural Business Cooperative Service. RBS Research Report 194.

Salamon L. Land and Minority Enterprise: The Crisis and the Opportunity. Washington, D.C.: U.S. Department of Commerce, Office of Minority Business Enterprise, Policy Research Study; 1976.

Schulman MD. White and Non-White North Carolina Farm Operators: A Comparison. J Soc Behav Sci. 1989;35(1):9–22.

Stark, Oded. (2003). "Tales of Migration without Wage Differentials: Individual, Family, and Community Contexts." *University of Vienna Austria & University of Bonn Germany. Conference on African Migration in Comparative Perspective*, Johannesburg, South Africa. June 4–7, 2003.

U.S. Department of Agriculture. National Agricultural Statistics Service. (USDA/NASS).2008. Available at: http://www.nass.usda.gov/Newsroom/printable/2_10_05.htm Accessed July 8, 2008.

U.S. Department of Commerce. *Bureau of Economic Analysis (BEA).*2008.

U.S. Department of Commerce. Bureau of the Census. (1969, 1974, 1982, 1987, 1992, 1997, 2002). Census of Agriculture .Geographic area series. Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. State and County Data.

United States Department of Agriculture/National Agricultural Statistics Service (USDA/NASS). Agricultural Prices. Various years. http://www.nass.usda.gov/

United States Department of Labor, Bureau of Labor Statistics (BLS).2008.

USDA/ERS, "Briefing Room Cotton." Available at: http:www.ers.usda.gov/Briefing/Cotton/. Accessed November 11, 2008.

USDA/ERS, "Briefing Room Rice." Available at: http:www.ers.usda.gov/Briefing/Rice/. Accessed November 11, 2008.

USDA/NASS Quick Stats: Agricultural Statistics Data Base. http://www.nass.usda.gov/Census/. Accessed September 13, 2010.

Veneman, Ann M. (2003), "USDA Awards Grants to Assist Socially Disadvantaged Farmers and Ranchers". Available at: http://www.csrees.usda.gov/newsroom/news/2003news/assist_ranchers.html

Wailes, Eric J. 2005. "Rice: Global Trade, Protectionist Policies, and the Impact of Trade Liberalization." In *Global Agricultural Trade and Developing Countries*, Eds. M. Ataman Aksoy and John C. Beghin. Washington D.C.: The World Bank, pp. 177–193.

Wood S, Gilbert J. Returning African American Farmers To The Land: Recent Trends and A Policy Rationale. Rev Black Polit Econ. 2000;27(4):43–64.

Wood, S. and J. Gilbert. (1998). "Re-Entering African-Amercian Farmers: Recent Trends and a Policy Rationale*." An Institute for Research and Education on Social Structure, Rural Institutions, Resource Use, and Development*, Working Paper (12).